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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/697,708	10/25/2000	Ulf Ahlfors	6563-54185	4828
7590	12/08/2004		EXAMINER HAN, CLEMENCE S	
Donald L. Bartels Coudert Brothers LLP Two Palo Alto Square 3000 El Camino Real, Fourth Floor Palo Alto, CA 94306-2121			ART UNIT	PAPER NUMBER
			2665	
			DATE MAILED: 12/08/2004	

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s) <sup>6</sup>	
	09/697,708	AHLFORS ET AL.	
	Examiner	Art Unit	
	Clemence Han	2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19,20,43 and 44 is/are allowed.
- 6) ☒ Claim(s) 1-18, 21-42 and 45-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Responsive to amendment received on July 1, 2004, amended claims 1, 18-20 and 42-44 are entered as requested.

### ***Claim Rejections - 35 USC § 102***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claim 1-7, 22-31 and 46-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Rom et al. (US Patent 6,252,849).

Regarding to claim 1 and 25, Rom teaches a method for controlling a switch comprising: a number of input ports, each receiving data cells on a respective link (Figure 2); a number of output ports sharing a buffer space 305 in which each output port can reserve space for an output queue (Figure 2), wherein incoming data cells are switched to an appropriate output queue (Column 4 Line 19-23); a flow control means for pausing and un-pausing senders on selected links (Column 7 Line 27, 41); the method including the steps of: monitoring the remaining available buffer space AS of the shared buffer; estimating the expected total content LE ( $N \cdot \text{Coff}$ ) of the links (Column 12 Line 33-41); calculating a free margin (FM) as the remaining available buffer space minus the expected total

content of the links  $FM=AS-LE$  (Column 12 Line 46); if the free margin sinks below a threshold  $AS-LE < A$ , then a selected link is paused (Column 7 Line 27); if the free margin thereafter raises above a threshold  $AS-LE > B$ , then a selected paused link is un-paused (Column 7 Line 39-40).

Regarding to claim 2 and 26, Rom teaches flow control means comprising a pause frame generator for generating pause frames to be sent to data senders in order to pause senders on a selected link (Column 7 Line 27), and generating un-pause frames to be sent to data senders in order to un-pause senders on a selected paused link (Column 7 Line 41).

Regarding to claim 3 and 27, Rom teaches the content  $LE$  of the links estimated as the sum of the contents of all the input links (Column 12 Line 46).

Regarding to claim 4 and 28, Rom teaches the estimation of the content  $LE$  of the links takes into account the different link lengths and bit rates (Column 12 Line 37-41).

Regarding to claim 5-7 and 29-31, Rom teaches sending a pause frame to inhibit transmission from an input link (Column 7 Line 27). The response latency to the generated pause frame is inherent due to the propagation delay and is well known in the art.

Regarding to claim 22 and 46, Rom teaches the threshold A is set to zero (Column 12 Line 46).

Regarding to claim 23 and 47, Rom teaches the threshold A is set to a negative value (Column 9 Line 37-39).

Regarding to claim 24 and 48, Rom teaches the threshold A is less than or equal to the threshold B (Column 11 Line 35).

***Claim Rejections - 35 USC § 103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claim 8-18, 21, 32-42 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rom et al. in view of Ren et al. (US Patent 6,456,590).

Regarding to claim 8 and 32, Rom teaches the maximum amount of data is related to the propagation delay. Rom, however, does not teach the maximum amount of data equals twice as much as a round trip content plus two full-sized packets. Ren teaches the maximum amount of data equals twice as much as a round trip content plus two full-sized packets (Column 10 Line 40-41). It would have been obvious to one skilled in the art to use in Rom twice as much as a round trip content plus two full-sized packets as taught by Ren in order to consider the response latency to avoid overflow.

Regarding to claim 9 and 33, Ren teaches the minimum amount of data equals one full-sized packet (Column 10 Line 34).

Regarding to claim 10 and 34, Ren teaches the slopes of the linear increase and decrease depend on the bit rate of the respective link (Column 10 Line 41).

Regarding to claim 11 and 35, Ren teaches the most offending sender is paused first (Column 11 Line 25-28).

Regarding to claim 12 and 36, Ren teaches the least offending sender is un-paused first (Column 11 Line 36-38).

Regarding to claim 13 and 37, Ren teaches detecting offending senders by means of an overflow sum counter OFS 80.

Regarding to claim 14 and 38, Ren teaches a counter OFS associated with each input port, (Column 8 Line 37-39) and increased each time the input port sends a packet to a congested output port (Column 7 Line 57-64).

Regarding to claim 15 and 39, Ren teaches the counter OFS of each input port is increased with the packet length (Column 8 Line 40-41).

Regarding to claim 16 and 40, Ren teaches the counter OFS is reset to zero when its associated input port receives an un-pause frame (Column 10 Line 10).

Regarding to claim 17 and 41, Rom teaches an output port is considered congested if the queue length thereof exceeds a threshold (Column 10 Line 31-32).

Regarding to claim 18 and 42, Rom teaches a method for controlling a switch comprising: a number of input ports, each receiving data cells on a respective link (Figure 2); a number of output ports sharing a buffer space 305 in which each output port can reserve space for an output queue (Figure 2), wherein incoming data cells are switched to an appropriate output queue (Column 4 Line 19-23); a flow control means for pausing and un-pausing senders on selected links (Column 7 Line 27, 41); the method including the steps of: monitoring the remaining available buffer space AS of the shared buffer; estimating the expected total content LE ( $N \times \text{Coff}$ ) of the links (Column 12 Line 33-41); calculating a free margin (FM) as the remaining available buffer space minus the expected total content of the links  $\text{FM} = \text{AS} - \text{LE}$  (Column 12 Line 46); if the free margin sinks below a threshold  $\text{AS} - \text{LE} < A$ , then a selected link is paused (Column 7 Line 27); if the free margin thereafter raises above a threshold  $\text{AS} - \text{LE} > B$ , then a selected paused link is un-paused (Column 7 Line 39-40). Rom teaches flow control means comprising a pause frame generator for generating pause frames to be sent to data senders in order to pause senders on a selected link (Column 7 Line 27), and generating un-pause frames to be sent to data senders in order to un-pause senders on a selected paused link (Column 7 Line 41). Rom teaches an output port is considered congested if the queue length thereof exceeds a threshold (Column 10

Line 31-32). Rom, however, does not teach the most offending sender paused first, detecting offending senders by means of an overflow sum counter OFS, a counter OFS associated with each input port, and increased each time the input port sends a packet to a congested output port, the queue length threshold equals a maximum length packet. Ren teaches the most offending sender is paused first (Column 11 Line 25-28), detecting offending senders by means of an overflow sum counter OFS 80, a counter OFS associated with each input port, (Column 8 Line 37-39) and increased each time the input port sends a packet to a congested output port (Column 7 Line 57-64), the queue length threshold equals a maximum length packet (Column 13 Line 61-62). It would have been obvious to one skilled in the art to modify Rom to pause most offending sender as taught by Ren in order to ensure no buffer overflow (Column 11 Line 25).

Regarding to claim 21 and 45, Ren teaches all the OFS counters are decreased linearly with time (Column 8 Line 41-43).

### ***Response to Arguments***

6. Applicant's arguments filed on July 1, 2004 have been fully considered but they are not persuasive.
7. Regarding to claim 1-7, 22-31 and 46-48, the applicants argue that Rom does not disclose the step of estimating the expected total content LE of the link on



which the input ports received data cells and also does not disclose the step of calculating a free margin (FM) as the remaining available buffer (AS) space minus LE (Remarks page 13 last paragraph). Rom teaches estimating the expected total content LE ( $N \cdot \text{Coff}$ ) of the link on which the input ports received data cells (Column 12 Line 33-41). The specification define the available buffer space (AS) as the total memory space minus the currently occupied space and minus any reserved space (Specification page 6 Line 9-10). Rom teaches the available buffer space as the total memory space (B) minus the currently occupied space (H) and minus any reserved space (M) (Column 12 Line 46). Rom also teaches  $AS (B - M - H) - LE (N \cdot \text{Coff})$  must be greater than zero to guarantee no discarding of packets by the switch due to the delay in the transmission and effect of the pause frame (Column 12 Line 42-45).

Therefore, the examiner contends that Rom in view of Ren teaches every limitations of the claims.

***Allowable Subject Matter***

8. Claim 19 and 43 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Prior art of the record, cited herein, fails to disclose when one counter reaches this maximum, all counters are divided by 2.

9. Claim 20 and 44 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Prior art of the record, cited herein, fails to disclose when one counter reaches this maximum, the value of the smallest counter is subtracted from all the counters.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clemence Han whose telephone number is (571) 272-3158. The examiner can normally be reached on Monday-Thursday 7 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Clemence Han  
Examiner  
Art Unit 2665



ALPUS H. HSU  
PRIMARY EXAMINER